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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER STOUFFER, KELLY M	
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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/511,440  
Filing Date: October 25, 2004  
Appellant(s): KAKIMOTO ET AL.

\_\_\_\_\_  
Christopher A. Bullard  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 15 April 2008 appealing from the Office action mailed 20 August 2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

2002/0034857 A1

PARK ET AL.

03-2002

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent publication 2002/0034857 A1 to Park et al.

As to claims 7-9 and 12-14, Park et al. discloses a processing method for processing an object to be processed by using a processing apparatus including a processing chamber; a shower head structure; installed at a ceiling portion of the processing chamber, having a plurality of gas jetting holes formed on a gas jetting surface thereof to inject a processing gas into the processing chamber, the gas jetting surface facing toward an inside of the processing chamber, and a mounting table installed in the processing chamber to face toward the shower head structure. (Figure 1, paragraphs 0028 and 0030)) Park et al. additionally discloses restricting the distance between the showerhead and mounting table (Figure 1), loading the object on the mounting table (which one of ordinary skill in the art would recognize was implied to have happened as the wafer is on the mounting table in Figure 1 and throughout the document), and introducing the processing gas through the gas jetting holes into the processing chamber, the processing gas being ozone to reform or anneal a tantalum

oxide film (paragraph 0006). Park et al. does not include using the claimed gas velocities or showerhead distances with the claimed relationship. However, Park et al. does include that showerhead distance (one would recognize that when looking at the apparatus labeled in Figure 1, by changing the height relative to the heater Park et al. is also changing the height relative to the showerhead and hence the area as described in the claims) and chamber pressures (which would include gas velocities that are directly related to chamber pressures) affect substrate temperatures (Figure 3, paragraphs 0041 and 0047) that determine the crystallinity of the final tantalum oxide film and leakage current of the film after annealing with ozone (paragraphs 0004-0008). The variables of distance between the substrate and showerhead, and gas velocities are therefore result-effective and are not inventive.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Park et al. to include distances between the substrate and showerhead and gas velocities in the ranges claimed by routine experimentation in order to receive an optimal amount of crystallization and leakage current in the resultant film, absent evidence showing a criticality of these variables commensurate in scope with the claims.

As to claims 10-11 and 15-16, Park et al. maintains a pressure and a temperature at a constant level while the precursors are being injected on page 4 et seq.

As to claims 17-19, the wafer stage and showerhead are circular as shown in Figures 6A and 6B and also in paragraphs 0028-0030. As to the size of the

showerhead relative to the wafer, one of ordinary skill in the art would recognize that the relative size of each is only dependant upon coating the entire wafer, as is the purpose of Park et al. Therefore, relative size is a result-effective variable and its modification is not inventive.

### **(10) Response to Argument**

Applicant's arguments filed 15 April 2008 have been fully considered but they are not persuasive. The applicant argues that Park et al. does not teach the distance between the substrate and the gas jetting surface and the gas jetting velocity as result effective variables. The applicant further argues that evidence for the criticality of claimed values is present in sections of the specification and the figures. However, Park et al. includes changing the position of the substrate relative to the heater in paragraph 0041 and in Figure 3. One would recognize that when looking at the apparatus labeled in Figure 1, by changing the height relative to the heater Park et al. is also changing the height relative to the showerhead and hence the area as described in claim 7. This change of distance occurs in Park et al. to affect the substrate temperature (paragraphs 0041 and 0047) that determine crystallinity in the film and leakage current (paragraphs 0004-0008). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Park et al. to include distances between the substrate and the heater, and consequently, the substrate and

the showerhead within the ranges of those claims by routine experimentation in order to achieve an optimal amount of crystallization and leakage current.

Park et al. additionally includes changing the chamber pressure in paragraph 0041 for the same reasons. One of ordinary skill in the art would realize that chamber pressure is directly affected by gas flow from a showerhead, and therefore it is obvious that this variable be modified by routine experimentation as well. Though the applicant asserts that changing gas jetting velocity does not necessarily result in a change of pressure if an outlet port is adjusted, it is clear from Park et al. that the pressure is increased in paragraph 0041, for example, and therefore increasing pressure of the gas would be caused by an increase in gas flow velocity. Further, movement of the substrate relative to the heater and therefore relative to the showerhead, discussed above as a result effective variable, would obviously effect the gas jetting velocity relative to the substrate - supporting that the gas jetting velocity is shown to be a result-effective variable dependant upon many experimental conditions.

As for showing criticality of the claimed values and the applicant's citation of the specification and Figures 4-9 as evidence of criticality of the claimed values, the examiner notes that evidence of criticality can only be shown when the evidence is commensurate in scope with the claims. The specification and drawings provide support for criticality of these values for only particular precursors, films, wafer sizes, etc. and not all gaseous precursors with all possible wafer sizes and films as claimed in the independent claims. The applicant provides no evidence showing that the critical values of gas jetting velocity and substrate/showerhead distances from the specific



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precursors and process parameters shown in the instant disclosure are applicable to the entire scope of the claims.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Kelly M Stouffer/

Examiner

Art Unit 1792

Conferees:

/Timothy Meeks/

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Supervisory Patent Examiner, Art Unit 1700